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09/386,270	08/31/1999	JAMES B. LOVELAND	7927.90	1223

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EXAMINER	
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ART UNIT	**PAPER NUMBER**
2123	9

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Please find below and/or attached an Office communication concerning this application or proceeding.

10

Office Action Summary	Application No.	Applicant(s)	
	09/386,270	LOVELAND, JAMES B.	
	Examiner	Art Unit	
	Ayal I Sharon	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 January 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Introduction

1. Claims 1-22 of U.S. Application 09/386,270 filed on 08/31/1999, and amended on 1/17/03 are presented for examination. The Application is a continuation of Application 08/991,148 filed 12/16/1997.

Claim Interpretations

2. Examiner interprets "morphing" (See specification: p.13, lines 8-12) as being equivalent to "changing" and "altering".
3. Examiner interprets "chamber" and "room" as being equivalent to "polyhedral object" or "polyhedral model". (See specification: p.7, lines 9-20).
4. Examiner interprets "recalculating" as being equivalent to "revising"

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless-

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. The prior art used for these rejections is as follows:

7. Schmitt, F., Barsky, B., Wen-hui Du. "An Adaptive Subdivision Method for Surface-Fitting from Sampled Data". Proceedings of the 13th Annual Conference on Computer Graphics and Interactive Techniques. pp.179-188. 1986. (Henceforth referred to as **"Schmitt").**

8. Claims 1-2, 5, 21 and 22 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Schmitt.

9. In regards to Claim 1, Schmitt teaches the following limitations:

> 1. A method for modeling a chamber to enable estimation of chamber attributes,
> comprising the steps of:
> (a) selecting a default volumetric polyhedron as an estimation polyhedron, said estimation polyhedron having a plurality of facets with each comprised of at least one estimation attribute including an area, wherein said estimation polyhedron estimates at least one of the group consisting of an area, volume and costs associated with at least one of said facets;
> (b) morphing a selected facet of said plurality of facets of said estimation polyhedron into a morphed facet to approximate said chamber undergoing estimation;
> (c) revising said at least one estimation attribute of said morphed facet and adjacent ones of said plurality of facets of said estimation polyhedron as modified by said morphing step; in order to maintain a closed volume of said estimation polyhedron; and
> (d) repeating said morphing and revising steps until said estimation polyhedron accurately depicts said chamber undergoing estimation.

(Schmitt, especially: Fig.11 and Fig. 12)

10. In regards to Claim 2, Schmitt teaches the following limitations:

> 2. The method as recited in claim 1, wherein:
> (a) said morphing step further comprises the step of when additional facets better approximate said chamber undergoing approximation, partitioning said selected facet of said estimation

polyhedron into at least a first and second morphed facets to provide an improved estimation of said chamber undergoing estimation; and

(b) said revising step further comprises the step of from said at least first and second morphed facets of said selected facet, including additional estimation attributes corresponding to said first and second morphed facets.

(Schmitt, especially: Fig.11 and Fig. 12)

11. In regards to Claim 5, Schmitt teaches the following limitations:

5. The method as recited in claim 1, wherein said selecting a default polyhedron further comprises the step of:

(a) defining said default polyhedron to include:

i. at least 4 facets each defined by a plurality of vertices shared by others of said at least 4 facets;

ii. a surface area for each of said at least 4 facets; and

iii. a volume of said default polyhedron as bounded by each of said at least 4 facets.

(Schmitt, especially: Fig.11 and Fig. 12)

12. In regards to Claim 21, Schmitt teaches the following limitations:

21. A method for computerized modeling of a chamber to enable estimation of chamber attributes, comprising the steps of:

(a) selecting a default polyhedron as [an] <u>a volumetric</u> estimation polyhedron, said estimation polyhedron having a plurality of vertices and facets with each facet having at least one estimation characteristic and comprised of at least one estimation attribute including an area<u>, wherein said estimation polyhedron estimates at least one of the group consisting of an area, volume and costs associated with at least one of said facets</u>;

(Schmitt, especially: Fig.11 and Fig. 12)

(b) dragging at least one of said plurality of verticies to alter at least one of said characteristics of a facet of said estimation polyhedron to approximate said chamber undergoing estimation:

(Schmitt, especially: Fig.11 and Fig. 12)

(c) recalculating said at least on estimation attribute of said altered facet and adjacent ones of said plurality of facets of said estimation polyhedron as modified by said [morphing] <u>altering</u> step <u>in order to maintain a closed volume of said estimation polyhedron</u>; and

(Schmitt, especially: Fig.11 and Fig. 12)

(d) repeating said altering and recalculating steps until said estimation polyhedron accurately depicts said chamber such that said calculated estimation attribute accurately estimates said chamber.

(Schmitt, especially: Fig.11 and Fig. 12)

13. In regards to Claim 22, Schmitt teaches the following limitations:

> 22. The method as recited in claim 21, wherein:
> said altering step further comprises the step of when additional facets better approximated said chamber undergoing approximation, partitioning said selected facet of said estimation polyhedron into at least a first and a second altered facet to provide an improved estimation of said chamber undergoing estimation.; and
> (Schmitt, especially: Fig.11 and Fig. 12)
>
> said recalculating step further comprising the step of including additional estimation attributes corresponding to said first and second altered facets.
> (Schmitt, especially: Fig.11 and Fig. 12)

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(x) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. The prior art used for these rejections is as follows:

16. Schmitt, F., Barsky, B., Wen-hui Du. "An Adaptive Subdivision Method for Surface-Fitting from Sampled Data". Proceedings of the 13th Annual Conference on Computer Graphics and Interactive Techniques. pp.179-188. 1986. (Henceforth referred to as **"Schmitt").**

17. MacCracken, R. and Joy, K. "Free-Form Deformations With Lattices of Arbitrary Topology". Proceedings of the 23`d Annual Conference on Computer Graphics and Interactive Techniques. pp.181-188. 1996. (Henceforth referred to as

"MacCracken").

18. Lerios, A. et al. "Feature-based Volume Metamorphosis". Proceedings of the 22nd Annual Conference on Computer Graphics and Interactive Techniques 1995. pp.449-456, 1995. (Henceforth referred to as **"Lerios")**

19. Edelsbrunner et al., U.S. Patent 5,850,229. (Henceforth referred to as **"Edelsbrunner")**

20. **Claims 3-4 and 6-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmitt in view of MacCracken.**

21. In regards to Claim 3, Schmitt teaches the following limitations:

> defining ... attributes to include a surface area correlating to said plurality of facets of said estimation polyhedron.
> (Schmitt, especially: Fig. 11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data" (abstract, p.179). However, Schmitt does not expressly teach the use of this for modeling rooms within a building.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings, with the teachings of MacCracken, to generate subunits, because doing so "allows a greater variety of deformable regions to be

defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

22. In regards to Claim 4, Schmitt teaches the following limitations:

> assigning one of said plurality of facets of said estimation polyhedron an attribute;

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings, with the teachings of MacCracken, to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

23. In regards to Claim 6, Schmitt teaches the following limitations:

> 6. A method for graphically estimating attributes of a room, comprising the steps of:
>
> (a) selecting a default <u>volumetric</u> polyhedron as an estimation polyhedron to approximate said attributes of said room, said estimation polyhedron having a plurality of facets with each comprised of at least

one estimation attribute including an area, wherein said estimation polyhedron estimates at least one of an area, volume and costs associated with at least one of said facets;

(b) morphing one of said plurality of facets of said estimation polyhedron to approximate said room undergoing estimation;

(c) revising said at least one estimation attribute of said morphed facet and adjacent facets of said estimation polyhedron in order to maintain a closed volume of said estimation polyhedron;

(d) repeating said morphing and revising steps until said estimation polyhedron accurately depicts said room undergoing estimation; and

(e) listing said estimation attributes of said estimation polyhedron as said attributes of said room.

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However,

Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig. 1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

24. In regards to Claim 7, Schmitt teaches the following limitations:

7. The method as recited in claim 6, wherein said selecting step further comprises the steps of:

(a) assigning one of said plurality of facets of said estimation polyhedron a floor attribute of said room;

> (b) assigning each of others of said plurality of facets of said estimation polyhedron adjacent to said facet having said floor attribute a wall attribute; and
> (c) assigning one of said plurality of facets of said estimation polyhedron adjacent to said ones of said plurality of facets having said wall attribute a ceiling attribute.

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

25. In regards to Claim 8, Schmitt teaches the following limitations:

> 8. The method as recited in claim 6, wherein:
> (a) said morphing step further comprises the step of when additional facets better approximate said chamber undergoing approximation, partitioning said selected facet of said estimation polyhedron into at least a first and second morphed facets to provide an improved estimation of said chamber undergoing estimation; and
> (b) said revising step further comprises the step of from said at least first and second morphed facets of said selected facet, including additional estimation attributes corresponding to said first and second morphed facets.

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

26. In regards to Claim 9, Schmitt teaches the following limitations:

> 9. The method as recited in claim 6, further comprising the steps of hierarchically grouping additional rooms into levels and grouping a plurality of levels into a structure.

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify

Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

27. In regards to Claim 10, Schmitt teaches the following limitations:

> 10. A graphical method for estimating material requirements for a room within a structure, wherein said room is comprised of a plurality of planes, comprising:
>
> (a) displaying a default surface polygon, said surface polygon forming one plane of a plurality of planes of [an] <u>a volumetric</u> estimation polyhedron for approximating said room, said plurality of planes each further having an estimation attribute assigned thereto<u>, wherein said estimation polyhedron estimates at least one of the group consisting of an area, volume and costs associated with at least one of said facets</u>;
>
> (b) morphing said default surface polygon into a morphed polygon to approximate a plane of said room undergoing estimation;
>
> (c) revising said estimation attribute of said morphed polygon and adjacent ones of said plurality of planes affected by said morphing step <u>in order to maintain a closed volume of said estimation polyhedron</u>;
>
> (d) repeating said morphing and revising steps until said estimation polyhedron accurately approximates said room undergoing estimation; and
>
> (e) converting said estimation attributes of said estimation polyhedron into said material requirements for said room within said structure.
>
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify

Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

28. In regards to Claim 11, Schmitt teaches the following limitations:

> 11. The method as recited in claim 10, wherein:
> (a) said morphing step further comprises the step of when additional planes better approximate said room undergoing estimation, partitioning said morphed polygon of said estimation polyhedron into at least a first and second morphed polygons to provide an improved estimation of said room undergoing estimation; and
> (b) said revising step further comprises the step of from said at least first and second morphed polygons of said selected facet, including additional estimation attributes corresponding to said first and second morphed polygons.
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

29. In regards to Claim 12, Schmitt teaches the following limitations:

> 12. The method as recited in claim 11, wherein said converting said estimation attributes of said estimation polyhedron step comprises the step of:
> (a) converting said estimation attribute into a quantity of a specific one of said material requirements.
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

30. In regards to Claim 13, Schmitt teaches the following limitations:

> 13. The method as recited in claim 11, further comprising the steps of:
> (a) redefining another one of said plurality of planes of said estimation polyhedron as said default surface polygon to display, morph and revise estimation attributes associated therewith.
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for

modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

31. In regards to Claim 14, Schmitt teaches the following limitations:

> 14. The method as recited in claim 10, wherein said displaying step further comprises the steps of:
> (a) assigning one of said plurality of planes of said estimation polyhedron a floor attribute of said room;
> (b) assigning each of others of said plurality of planes of said estimation polyhedron adjacent to said plane having said floor attribute a wall attribute; and
> (c) assigning one of said plurality of planes of said estimation polyhedron adjacent to said ones of said plurality of planes having said wall attribute a ceiling attribute.
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of

ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

32. In regards to Claim 15, Schmitt teaches the following limitations:

> 15. A computer-readable medium having computer-executable instructions for performing the steps comprising:
>
> (a) displaying a default surface polygon, said surface polygon forming one plane of a plurality of planes of [an] <u>a volumetric</u> estimation polyhedron for approximating said room, said plurality of planes each further having an estimation attribute assigned thereto<u>, wherein said estimation polyhedron estimates at least one of the group consisting of an area, volume and costs associated with at least one of said facets</u>;
>
> (b) morphing said default surface polygon into a morphed polygon to approximate a plane of said room undergoing estimation;
>
> (c) revising said estimation attribute of said morphed polygon and adjacent ones of said plurality of planes affected by said morphing step<u> in order to maintain a closed volume of said estimation polyhedron</u>;
>
> (d) repeating said morphing and revising steps until said estimation polyhedron accurately approximates said room undergoing estimation; and
>
> (e) converting said estimation attributes of said estimation polyhedron into said material requirements for said room within said structure.
>
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one

of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

33. In regards to Claim 16, Schmitt teaches the following limitations:

> 16. The computer-readable medium of claim 15 having further Computer executable instructions for performing the steps of:
> (a) said morphing step further comprises the step of when additional planes better approximate said room undergoing estimation, partitioning said morphed polygon of said estimation polyhedron into at least a first and second morphed polygons to provide an improved estimation of said room undergoing estimation; and
> (b) said revising step further comprises the step of from said at least first and second morphed polygons of said selected facet, including additional estimation attributes corresponding to said first and second morphed polygons.
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a

broader range of shape deformations can be generated".

(MacCracken, p.181, Abstract).

34. In regards to Claim 17, Schmitt teaches the following limitations:

> 17. The computer-readable medium of claim 15, wherein said computer executable instructions for performing the step of converting said estimation attributes of said estimation polyhedron step further comprises computer-executable instructions for performing the step of:
> (a) converting said estimation attribute into a quantity of a specific one of said material requirements.

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated".

(MacCracken, p.181, Abstract).

35. In regards to Claim 18, Schmitt teaches the following limitations:

> 18. The computer-readable medium of claim 15, having further computer executable instructions for performing the steps of:

(a) redefining another one of said plurality of planes of said estimation polyhedron as said default surface polygon to display, morph and revise estimation attributes associated therewith.

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes. MacCracken teaches lattice structures partitioned into sub-units (see Fig. 1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

36. In regards to Claim 19, Schmitt teaches the following limitations:

19. The computer-readable medium of claim 15, wherein said computer executable instructions for performing the step of displaying a default surface polygon further comprises computer-executable instructions for performing the step of:

(a) assigning one of said plurality of planes of said estimation polyhedron a floor attribute of said room;

(b) assigning each of others of said plurality of planes of said estimation polyhedron adjacent to said plane having said floor attribute a wall attribute; and

(c) assigning one of said plurality of planes of said estimation polyhedron adjacent to said ones of said plurality of planes having said wall attribute a ceiling attribute.

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use

of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

37. In regards to Claim 20, Schmitt teaches the following limitations:

> 20. The computer-readable medium of claim 15, having further computer executable instructions for performing the step of hierarchically grouping additional rooms into levels and grouping a plurality of levels into a structure.
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate subunits, because doing so "allows a greater variety of deformable regions to be defined, and thus a

broader range of shape deformations can be generated".

(MacCracken, p.181, Abstract).

Response to Arguments

Priority

38. Examiner acknowledges Applicant's amendment to the specification in order to claim priority to U.S. Patent 6,037,945, which was filed on Dec. 16, 1997. In response, Examiner has withdrawn the "Priority" objections of the Office Action.

Drawings

39. Examiner acknowledges Applicant's submission of Figures 1-9. While they are not identical to the figures in U.S. Patent 6,037,945, Examiner finds that they add no new matter. In response, Examiner has withdrawn the "Drawings" objections of the Office Action.

Claim Objections

40. Examiner acknowledges Applicant's amendment to Claim 21, limitation (c). The term "said morphing step" was replaced with the term "said altering step". Based on the context of the claim, Examiner interprets the said altering step" as being limitation (b) of Claim 21. Examiner has withdrawn the objection.

Double Patenting

41. Examiner acknowledges Applicant's submission of a terminal disclaimer in response to the double patenting rejections of Claims 1-5, 6-9, 10-14, 15-20, and 21-22 over U.S. Patent 6,037,945. In response, Examiner has withdrawn the rejections.

Claim Rejections - 35 USC § 112

42. Examiner acknowledges Applicant's amendment to Claims 1,5,10,15, and 21 to recite an estimation polyhedron "wherein said estimation polyhedron estimates at least one of a group consisting of an area, volume and costs associated with at least one of said facets." Examiner has withdrawn the associated 35 USC 112 first paragraph rejections.

Claim Rejections - 35 USC § 102

43. In regards to Claim 1, Applicants have amended the claim to expressly refer to a "default volumetric polyhedron" as an estimation polyhedron. Applicant's argue that Schmitt does not read upon Applicant's claim 1, <u>as amended</u>:

> "As amended, claim 1 recites 'selecting a default volumetric polyhedron as an estimation polyhedron [and] revising said at least one estimation attribute of said morphed facet and adjacent ones of said plurality of facets of said estimation polyhedron as modified by said morphing step in order to maintain a closed volume of said estimation polyhedron.' This amendment finds support in the specification as filed, as the specification teaches that the 'default entity utilized by the estimator [is] a volumetric entity having spatial definitions and attributes in all three dimensions,' and further that 'the default entity is a polyhedron which, by definition is a series of planes forming a closed volume.' See Specification, p.7, ln.20-25. Applicant finds no mention of this element in Schmitt, nor any equivalent thereof."

> "Although Schmitt teaches initial approximation of the sampled data utilizing a default surface, such default surface is strictly two-dimensional, derived from a "piecewise polynomial". See p.180, col.2; see also Figures 11(a) and 12(a). As Schmitt fails to disclose initially selecting and thereafter

maintaining a three-dimensional volumetric polyhedron as claimed by the present application, Schmitt fails to anticipate the present invention under Section 102(b)."

Examiner respectfully disagrees with Applicant's argument that neither the amended element, nor an equivalent, is mentioned in Schmitt. For example, Fig.2 of Schmitt is a photograph that shows a "microprocessor-controlled 3D Video-laser data acquisition system." It is clear from this photo, as well as from Fig.3, and Fig.10-14, that the acquired data is that of a sculpture of a human head. Moreover, Fig.3 is a 360 degree "cylindrical case" image that demonstrates that the database of the head includes data points from all sides of the statue.

Based on this teaching, Examiner finds the grids in Fig.10-12 to be examples of volumetric polyhedrons. Moreover, the left columns of Fig.11 and Fig.12 represent volumetric estimation polyhedrons having spatial definitions and attributes in all 3 dimensions, and the grids are composed of planes forming closed volumes.

Therefore, Examiner is maintaining the rejection of Claim 1.

44. Applicants argue that Claims 2-5 "place further limitations on allowable subject matter". Examiner disagrees, as described in detail in the immediately preceding paragraph. Since the Applicant is silent in regards to the limitations in Claims 2 and 5, Examiner is also maintaining the rejections of dependant Claims 2 and 5. Examiner is maintaining the Schmitt reference as the basis for the 35 USC 103 rejections of Claims 3 and 4.

Claim Rejections - 35 USC § 103

45. In regards to the rejections of claims 3-4 and 6-20, Applicants argue that the prior art does not address limitations of claims 1, 6, 10, 15, and 21 <u>as amended</u>.

46. More specifically, in regards to Claims 1, 6, 10, 15, and 21, the art does not address a "selecting a default volumetric polyhedron as an estimation polyhedron", wherein the estimation polyhedron has a "plurality of facets with each comprised of at least one estimation attribute", wherein the estimation attribute is designed to include "the attribute of a 'missing wall'", as described in Specification, p.18, line 7-9. (See paper #7, p.10, line 18 to p.11, line 1).

47. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the attribute of a 'missing wall') are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

48. Moreover, the Specification, p.18 line 3-9 says the following:

> "Additional attributes or characteristics may also be defined for planes of the estimation polyhedron. For example, a plane, and therefore a polygon, may be assigned the attribute forming a wall portion of the polyhedron and also be given a wall thickness attribute or a wall composition attribute to facilitate both accurate dimensioning and estimation of the target chamber or room. Likewise, a plane **may** be given the attribute of a 'missing wall' thereby precluding the inclusion of such a plane in the estimation calculations."

Therefore, the attribute of a 'missing wall' may or may not be given to the plurality of facets. In order to give the term 'attribute' the broadest reasonable interpretation, Examiner has not restricted its meaning to be equivalent to a "missing wall attribute."

49. Applicants also repeat (paper #7, p.11, lines 2-6) the argument used in to traverse the 102(b) rejections that:

> "Schmitt neither discloses nor suggests selecting a default volumetric estimation polyhedron and maintaining its volumetric integrity throughout the estimation process as disclosed by the present application"

Examiner has addressed these arguments in paragraph 48 of this Office Action.

50. Applicants also argue (paper #7, p.11, lines 12-16) that MacCraken teaches away from the claimed invention by specifying that "a polyhedron with a missing face is not valid and may not be utilized for the purposes of the MacCraken invention."

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the attribute of a 'missing wall') are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Moreover, the Specification, p.18 line 3-9 says the following:

> "Additional attributes or characteristics may also be defined for planes of the estimation polyhedron. For example, a plane, and therefore a polygon, may be assigned the attribute forming a wall portion of the polyhedron and also be given a wall thickness attribute or a wall composition attribute to facilitate both accurate dimensioning and estimation of the target chamber or room. Likewise, a plane **may** be given the attribute of a 'missing wall' thereby precluding the inclusion of such a plane in the estimation calculations."

Therefore, the attribute of a 'missing wall' may or may not be given to the plurality of facets. Other possible attributes are listed in the specification, such as wall thickness and wall composition. In order to give the term 'attribute' the broadest reasonable interpretation, Examiner has not restricted its meaning to be equivalent to a "missing wall attribute."

51. Applicants also argue (paper #7, p.11, lines 17-21) that:

> "Moreover, MacCracken is properly considered non-analogous art as the purpose of the invention disclosed therein is to deform an already defined space rather than to initially define a space. One skilled in the art would therefore not be motivated to modify MacCracken to model a chamber and assign facets of the chamber estimation attributes as disclosed by the present invention."

Examiner respectfully disagrees with Applicant's argument. The independent claim, Claim 1 refers to "morphing a facet", which Examiner finds equivalent to what the Applicant argues that the cited prior art teaches: "deform[ing] an already defined space". Hence Examiner finds that the cited art is analogous.

52. Therefore, Examiner does not find Applicant's arguments (paper #7, p.11 line 22 to p.12 line 2) to be persuasive and is maintaining the 35 USC 103 rejections, based on Schmitt and MacCracken, of Claims 6, 10, and 15.

53. Applicants argue (paper #7, p.12, lines 3-4) that Claims 3-4, 7-9, 11-14, and 16-20 "place further limitations on allowable subject matter". Examiner disagrees, as described in detail in the immediately preceding paragraphs 48-57. Since the Applicant is silent in regards to the limitations in Claims 3-4, 7-9, 11-14, and 16-20, Examiner is also maintaining the rejections of dependant Claims 3-4, 7-9, 11-14, and 16-20.

54. In regards to Claim 21, Applicants argue (paper #7, p.12, lines 8-12) that:

> "Claim 21 teaches a method for computerized modeling of a chamber to enable estimation of chamber attributes utilizing a single default polyhedron as an estimation polyhedron. Applicant finds no mention of this element in any reference, nor any equivalent therof. Rather, Lerios and Edelsbrunner require at least two input images or volumes in order to create a morphed image. See Lerios, p.450, Section 3.1; see also Edelsbrunner Abstract."

Examiner finds Applicant's argument to be persuasive and is withdrawing the rejections of Claims 21-22 based on Edelsbrunner and Lerios. Examiner is

substituting new 35 USC 102 rejections of Claims 21-22 based on Schmitt, as necessitated by amendment.

Conclusion

55. Applicant's arguments filed 1/17/03 have been fully considered but they are not persuasive.

56. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (703) 306-0297. The examiner can normally be reached on Monday through Thursday, and the first Friday of a biweek, 8:30 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska can be reached on (703) 305-9704. Any response to this office action should be mailed to:

Director of Patents and Trademarks
Washington, DC 20231

Hand-delivered responses should be brought to the following office:

4th floor receptionist's office

Crystal Park 2
2121 Crystal Drive
Arlington, VA

The fax phone numbers for the organization where this application or proceeding is assigned are:

Official communications:	(703) 746-7239
Non-Official / Draft communications	(703) 746-7240
After Final communications	(703) 746-7238

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist, whose telephone number is: (703) 305-3900.

Ayal I. Sharon

Art Unit 2123

November 25, 2002

KEVIN J. TESKA
SUPERVISORY
PATENT EXAMINER